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Nanolpium species (Garypoidea, Olpiidae) on grasses in southern Africa – a new niche for pseudoscorpions

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Nanolpium **species (Garypoidea, Olpiidae) on grasses in southern Africa – a new niche for pseudoscorpions.** - The presence of *Nanolpium* species on herbaceous plants is shown to be a common and widespread phenomenon in southern Africa. Two collections have been studied: one from the galls of *Stipagrostis* grasses in Namibia; the other a general collection from grasses and other vegetation at several localities in Zimbabwe. This an unusual ecological niche for pseudoscorpions, which only *Nanolpium* is known to occupy regularly. The significance of these findings is discussed, though many questions regarding the biology of *Nanolpium* species remain unresolved.

Key-words: Pseudoscorpions – *Nanolpium* – herbaceous – ecology – southern Africa.

INTRODUCTION

Pseudoscorpions are one of the most successful orders of Arachnida, probably surpassed only by mites and spiders in terms of abundance and numbers of species. As one might expect, this is largely due to their having colonized a wide variety of habitats.

However, one habitat from which they are rarely recorded is the herbaceous layer. The reasons for this absence are not immediately apparent, but it may be that grasses and shrubs are too exposed for most pseudoscorpions, which are markedly cryptozoic as a rule. Scattered records of pseudoscorpions from 'foliage' or 'vegetation' are usually too vague to suggest definite associations and may often be fortuitous, the animals coming from around the roots or from accumulated debris. In other

[1] Part of this work was carried out while MLIJ was a postgraduate student at the Department of Pure and Applied Biology, University of Leeds, England.

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cases (such as that of *Neobisium sylvaticum* (C.L. Koch)), their presence may be temporary, with plants being climbed in response to heavy rainfall (HORVÁTH 1885).

An exception is provided by *Nanolpium* Beier. This genus is widespread in southern Africa, with eight species having been described from Namibia, South Africa, Mozambique, Botswana, Zimbabwe, Zambia and Zaire (HARVEY 1991)[2]. Like most other African pseudoscorpions, the habits of these species are poorly known, the few previous indications being:

N. milangianum Beier – under stones on forest floor (Mozambique) (BEIER 1964);

N. pusillum (Ellingsen) (syn. *N. falsum* Beier) – from dry *Juncus* heath (Cape Province) (BEIER 1955) and under stones on open grass near mountain top (Cape Province) (BEIER 1966);

N. pusillum? (nymph) under stones in dry heath with low bushes (Cape Province) (BEIER 1955);

N. rhodesiacum Beier – from vegetation along bank of the Zambesi River (Zambia) (BEIER 1955);

N. transvaalense Beier – under stones in grassland (Transvaal) (BEIER 1964).

In recent years we have independently received collections containing numerous specimens of *Nanolpium* species from Zambia, Zimbabwe, South Africa (MLIJ) and Namibia (JH). The material from Zimbabwe was collected by beating and sweeping of grasses and shrubs at different localities, by the late J. I. Minshull and her colleagues. The suspicion that there might be something unusual about the ecology of this genus is supported by a more detailed ecological study, by L. Praetorius, of the fauna associated with galls of the perennial grasses *Stipagrostis sabulicola* and *S.* cf. *namaquensis* in Namibia. The pseudoscorpions were collected from galls – situated randomly along the length of the plant – both before and after emergence of the causative agent (a moth larva). There is no apparent seasonality in these records, which were made at two-monthly intervals over a period of one and a half years. The presence of all stages of the pseudoscorpions might be due to the associated fauna of mites and psocopterans, which could serve as prey. Unfortunately, no data are available from that study regarding plants without galls.

It appears that *Nanolpium* is the only genus consistently collected from grasses and shrubs in southern Africa. It is also clear that a wide variety of *Nanolpium* species is involved, suggesting that the utilisation of this habitat may be characteristic of the genus. However, *Nanolpium* species are not restricted to this habitat, having sometimes been found under stones and by beating trees and bushes. Species of the closely related genus *Ectactolpium* Beier, also southern African, have only been recorded from under stones or, less often, in humus or termites' nests.

The material listed below is deposited in the Muséum national d'Histoire naturelle, Paris (MNHN), the National Museum of Zimbabwe, Bulawayo (NMZ) and

[2] Harvey lists seven species under this genus in his catalogue: the eighth is *Nanolpium subgrande* (Tullgren) (BEIER 1955).

the South African Museum, Cape Town (SAM). Grid references (taken from the original labels) are in a 1/4° format: Bulawayo (20°10'S 28°43'E), for example, has the grid reference 2028B1. The abbreviations Ad, T, D, P refer to adults, trito-, deuto- and protonymphs, respectively.

RECORDS OF *NANOLPIUM* SPECIES FROM VEGETATION

Zambia

Nanolpium smithersi Beier

1 ♀, Batoka Gorge, grid ref. 1726C3, 29–30.7.1990, F. Nyathi, beating, riverine (NMZ/P1).

Zimbabwe

Nanolpium congicum Beier

1 ♂, Sohwe Falls, Mavuradonha Wilderness Area, 600 m a.s.l., grid ref. 1631A3, 27.8.1989, J. Minshull, sweeping below Falls (NMZ/P33); 7 ♂, 10 ♀, 1 T, Mwatombo, Gonarezhou National Park, grid ref. 2131C3, 26.6.1985, P. Kagoro, *Androstachys/Xerodderis* woodland, beating (NMZ/P48); 2 ♂, 2 ♀, Chipinda Pools, Gonarezhou National Park, grid ref. 2131B4, 20.4.1985, J. Minshull, Mopane, beating (NMZ/P45), 1 T, same data, except beaten from thorny tree; 1 ♀, Chipinda Pools, Gonarezhou National Park, grid ref. 2131B4, 19.4.1985, J. Minshull, beating, edge of Runde River (NMZ/P46); 1 ♂, 1 ♀, Chitove Rapids, Runde River, Gonarezhou National Park, grid ref. 2132A4, 22.4.1985, J. Minshull, large island in centre of river, beating (NMZ/P49); 1 ♂, Chivirira Falls, Save River, Gonarezhou National Park, grid ref. 2132A2[?], 23.4.1985, J. Minshull, beating bushes on exposed falls area (NMZ/P57); 8 ♂, 3 ♀, 4 T, 1 D, Esquilingwe Weir, grid ref. 2031C4, 23.4.1987, J. Minshull, beating (NMZ/P51).

Nanolpium cf. *milangaum* Beier

3 ♂, 1 T, Pomongwe Access Road, Matopos National Park, grid ref. 2028D1, 5.2.1987, J. Minshull, beating (NMZ/P4); 4 ♂, 1 ♀, Maleme Rest Camp, Matopos National Park, grid ref. 2028D1, 7–12.2.1987, J. Minshull, sweeping on edge of river at Potholes (NMZ/P5); 4 ♂, 1 ♀, Maleme Rest Camp, Matopos National Park, grid ref. 2028D1, 4.2.1987, J. Minshull, beating ? *Pavonia* [tree] (NMZ/P6); 1 T, 1 D, Rowallan Park, Matopos National Park, grid ref. 2028B3, 3.5.1989, F. Nyathi, beating (NMZ/P7); 1 ♀, Mugobe Pools, Deka River, grid ref. 1826A3, 13.8.1985, leg. N.H.M.Z., beating tree (NMZ/P 27).

Nanolpium sp. A

2 ♂, Store Camp, Humani Ranch, grid ref. 2032C2, 9.4.1987, leg. Falcon College-N.H.M.Z., sweeping mixed grasses (NMZ/P24); 4 ♂, 1 ♀, with same data, except beaten from xerophytes in *Euphorbia-Adansonia* islands in *Acacia tortilis* grassland (NMZ/P26).

Nanolpium transvaalense Beier

1 ♀, Causeway Crossing at Doddieburn Ranch H.Q., east bank of Umzingwane River, grid ref. 2129A4, 20.12.1985, F. Nyathi, sweeping grass (NMZ/P 19); 1 T, Umzingwane River near Hunters Camp, Doddieburn Ranch, grid ref. 2129A4, 20.12.1985, J. Minshull, sweeping (NMZ/P 21); 1 ♂, 1 ♀, Rukomechi Gorge, grid ref. 1629A2, 7.12.1984, leg. Falcon College-N.H.M.Z., riverine beating (NMZ/62).

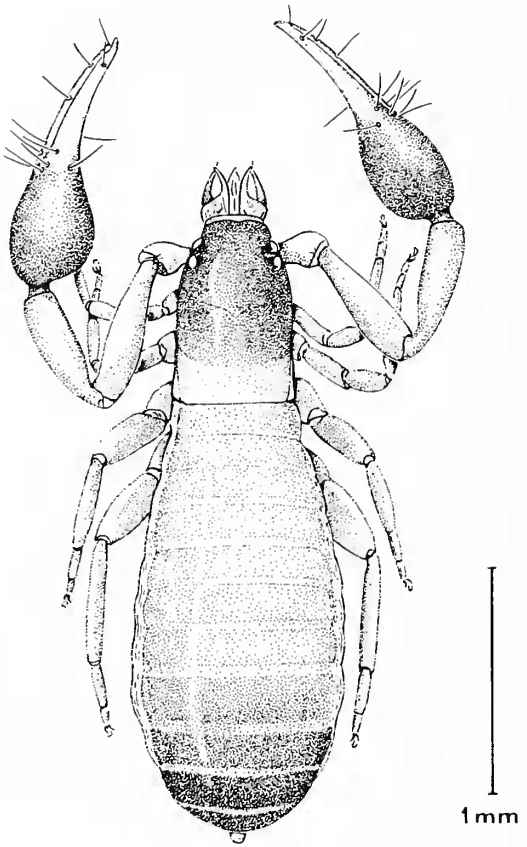

FIG. 1

Nanolpium pusillum, male, collected from sedges in foothills of Hex River Mountains, South Africa (drawing by J. Rebière)

Namibia

Nanolpium sp. B

7 Ad, 2 D (6 collections), Kalahari Drive, 6 km SW of Desert Research Station, Gobabeb; 16 Ad (1 ♀ with egg-sac), 1 T, 2 P (13 collections), Noctivaga Dune, 29 km SE of Desert Research Station, Gobabeb; 18 Ad (1 ♀ with egg-sac), 1 T, 1 P (13 collections), Mniszechi's vlei, 48 km ESE of Desert Research Station, Gobabeb; 3 Ad, 1 nymph (4 collections), Far East, 82 km ESE of Desert Research Station, Gobabeb. All specimens collected from galls on *Stipagrostis sabulicola* and *S.* cf. *namaquensis* (MNHN).

South Africa

Nanolpium pusillum (Ellingsen)

8 ♂, 2 ♀, 20.11.1981, foothills of Hex River Mountains, 40 km E of Ceres, W. Cape, South Africa, grid ref. 3319BC, C. A. Car, in sedges (SAM); 2 ♀, with same data, except 21.11.1981, 'yellow flowers' (SAM).

DISCUSSION

Although an association between *Nanolpium* species and grass/shrub habitats seems well established, many questions remain to be answered.

The most obvious question is how do *Nanolpium* species arrive on the plants? No species of Olpiidae is known to be phoretic, nor do they show any modifications typical of phoresy in pseudoscorpions. We therefore doubt that this is a likely explanation. The only alternative is that they simply walk up the stems, and it would be interesting to know under what conditions this might occur.

It is noticeable that many of the collections come from vegetation at the edge of rivers, streams and pools. Is this the result of favourable microclimate, an associate with particular plants (e.g. sedges), or simply collecting bias? Particular attention needs to be paid to the species on which *Nanolpium* are found, as well as which part of the plant they occupy. It is unlikely that they are limited to galls, though this is evidently a favourable site on grasses.

In short, there is much interesting, yet comparatively simple, work which could be done in the field. Our hope, in drawing attention to this unexpected association, is that someone with access to suitable habitats in southern Africa will study the ecology of *Nanolpium*.

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